

Poly Canyon Observation Deck

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The Poly Canyon Observation Deck is a project that I have been moving through preconstruction for the past year. It started as a solo project but quickly evolved into an interdisciplinary project involving two architectural engineers and myself. Together we developed a project proposal that we presented to Cal Poly Facilities along with our building permit application. They have approved our proposal and have awarded us a provisional building permit which will be approved after they review the 100% construction documents. We have been working the past two quarters to finalize the design, select materials, and perform a complete structural analysis. My partners have recently completed the structural calculations which are now under peer review and are waiting to be stamped.

Key Words: Preconstruction, Permitting, BIM, Scheduling

Project Development

Ever since I first learned that there were student built structures out in Poly Canyon, it has been my goal to build a structure of my own that will inspire those who come after me. This project started with the idea of building an

observation platform at the top of Poly Canyon where students could go and use as a place to relax, watch the sunset, or even study. This project quickly became more work than one person could handle so I requested the help of two architectural engineers, Emir Kuljancic and Sitora Vaxidova, to assist with the structural design. Together, we have moved this project all the way through preconstruction and have fully developed a complete set of construction documents, structural calculations, and a detailed model.

Processes

In order to start the preconstruction process, we developed a proposal with a conceptual design and pitched it to Mike Hogan, a project manager for Cal Poly Facilities. The proposal took our team approximately one week to write because we also developed a 3-D conceptual rendering of our design. This was done in order to strengthen our chances of receiving a preliminary design permit so that we could move forward with the structural design process. After meeting with Mike for the first time, he had some logistical, environmental, and legal concerns about our ideas for this project. He told us we needed approval from the College of Agriculture because Poly Canyon is in the middle of a pasture where their livestock grazes during parts of the year. Mike put us in contact with Kevin Paper, the head of the land development for the College of Agriculture.

During our meeting with Kevin, we discussed his concerns about livestock safety and site location. We developed numerous design requirements intended to reduce the risk of injury to the animals. Some examples of these design requirements included all exterior finished edges to be made in such a way that livestock cannot cut themselves if they rub against structure and no opening shall be between 4 and 12 inches so animals are not able to get their head stuck in the structure. Kevin was also concerned with the location chosen because it was out of the footprint of the existing structures, which would increase the likelihood of livestock interaction with the structure.

Once we received approval from Kevin, we started reviewing the updated drawings with Mike. After Mike had signed off on the updated design we began work on the structural design and calculations. During this time, Mike

had raised some environmental concerns and put me in contact with Kelly Porter from Cal Poly's Environmental Resource Management Department. Kelly and I met at the project site in April to discuss our storm water pollution prevention plan. Immediately following our meeting, I received an email from Kelly informing me the Department of Environmental Resource Management had signed off on the project and we could move forward with permitting.

As the construction drawings were developed, I brought Mike a set of 50% construction documents to review. This was when Mike raised some concerns about ADA compliance. We were working under the assumption that our project site was outside of what would be considered a reachable zone under title 24. When we were advised we would have to update the design to be fully ADA compliant, we were a bit shocked. Luckily, we only had to add a railing going up the main stairway. After we agreed to add the railing, Mike sent us a provisional building permit. All that was left was to complete the structural calculations and submit them for peer review. As of June 10, 2018, the calculations were submitted for the peer review process and expected to be stamped and returned by the end of spring 2018 finals week.

Deliverables

Complete Construction Documents

The construction documents that we developed for this project include a title page which also serves as the general notes page, foundation floor bench and roof framing plans, and a details sheet. These documents were created with the intention they would also serve as the project specifications so all materials and member sizes are called out directly on the construction drawings. This was done to simplify the process and to avoid any miscommunication regarding what is intended to be installed.

Structural Calculations

Because this project is located on state property, Cal Poly required the construction drawings to be stamped by a licensed structural engineer so I was only involved with the calculations as a consultant for constructability reviews. My team of highly trained architectural engineering students worked for two months on the structural calculations and construction drawings. During this time, we had several meetings to discuss material choices, connection choices, and to redline construction drawings.

BIM Model

For this project, we used both Autodesk Revit and AutoCAD to develop a quality 3-D model of the observation deck. Revit was primarily used for the construction drawings and detailing, while AutoCAD was used to develop a piece by piece model to assist with constructability reviews. Using our model, we ran clash detections in search of conflicting connections. I also used AutoCAD to mock up details as a tool to help explain to my team how some of the connections are made.

Preconstruction Schedule

A preconstruction schedule was developed in the early stages of this project with the expectation that we would follow as closely as possible. Due to many unforeseen time delays, we were forced to treat the schedule as an active document that needed constant updating. This resulted in the project completion date to be pushed back time and time again.

Lessons Learned

This project has given me valuable real-world experience moving a construction project through preconstruction and permitting. I now understand there is a lot more that goes on during preconstruction than just picking a design and location. Everything starts with the pitch, if you cannot get your city officials, or in this case campus officials, to sign off on your idea, then you have no project. This also goes for other governing agencies such as CEQA and Cal Fire. Each agency has a specific time they typically get involved with the preconstruction process. For example, the state fire marshal is typically one of the last people to review the drawings before construction begins. This is because each agency is reviewing different aspects of the project for compliance with federal state and local building codes.